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A pilot randomised controlled trial to improve smoking cessation by maintaining NHS Stop Smoking Service attendance.

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ABSTRACT

Objectives: The NHS Stop Smoking Service (SSS) is an extremely cost-effective method of enabling smoking cessation. However, the SSS is only used by a minority of smokers.

Developing interventions to maintain service attendance may help to increase the number of quitters. This study pilots an intervention aimed at maintaining attendance by (a) increasing motivation to attend through a booklet providing evidence of service effectiveness, and (b) strengthening the link between motivation to attend and attendance through forming an

implementation intention. **Design:** A factorial randomised controlled trial. **Methods:** A total of 160 newly enrolled smokers at the Surrey NHS Stop Smoking Service were recruited and randomly assigned to one of four conditions: (i) standard care (SC), (ii) SC + effectiveness booklet, (iii) SC + implementation intention, and (iv) SC + effectiveness booklet +

implementation intention. The outcome measures included attendance at the SSS and the 4-

week quit rate. **Results:** The booklet increased service attendance (OR = 2.93, $p < 0.01$, 95% CI = 1.45-5.93; Number Needed to Treat (NNT) = 3.3) but had no impact on the 4-week quit rate (OR = 1.55, 95% CI = 0.75-3.21). Forming an implementation intention had no impact

on service attendance or the 4-week quit rate. Attending the service was associated with a

higher 4-week quit-rate (rho = 87.52, $p < 0.001$). **Conclusions:** Presenting information about

the effectiveness of the service improved service attendance. A larger trial now needs to evaluate whether this intervention can also increase the quit-rate.

INTRODUCTION

Smoking is one of the largest avoidable causes of death and disability, and encouraging cessation is one of the most cost-effective methods of maintaining health and prolonging life (Royal College of Physicians, 2002). Accordingly, the National Health Service (NHS) has developed nationwide Stop Smoking Services (SSS) which offer a range of smoking cessation treatments, including nicotine replacement therapy (NRT), Varenicline and Bupropion on prescription, and behavioural support in the form of group clinics, telephone support or one-to-one counselling. The most effective smoking cessation treatment is the combined use of behavioural support and medication, as offered by the SSS (Bauld, McCullough, Richardson & Greaves, 2010). Smokers quitting with the SSS have double the likelihood of quitting successfully after 12 months than those not using the SSS (West, McNeill & Raw, 2000).

Despite the wide range of treatments available and increased chances of success when quitting with the SSS, many smokers fail to take advantage of the services made available to them. Although just under half (46%) of the smokers in the UK try to quit in a given year (West, 2006), uptake of treatments is low (Lader, 2005; Cancer Prevention and Control Program, 2003; Kotz, Fidler & West, 2009; Kotz & West, 2009). While just over half (55%) of smokers attempting to quit try some form of medication to stop, only 6% of smokers use behavioural support (West & Fidler, 2010). Furthermore, over 50% of smokers enrolling in NHS SSS drop-out before the point of setting a quit date (Lowey, Fullard, Tocque & Bellis, 2002). Therefore, the vast majority of smokers are missing out on maximising their chance of stopping smoking. Maintaining service attendance in smokers who have enrolled for cessation support is of high importance for improving nationwide smoking cessation.

Intention to engage in a particular behaviour accounts for approximately 30% of our actual behaviour (Sheeran, 2002). Intentions, in turn, are closely associated with individuals' attitudes and underlying behavioural beliefs, such as perceptions about the effectiveness of engaging in the behaviour to achieve their goal (Armitage & Conner, 2001). Furthermore, changes in intentions lead to changes in behaviour across a wide range of contexts (Webb & Sheeran, 2006). Some smokers are not motivated to use the behavioural support and medication offered by the SSS because they perceive them as being ineffective at increasing their chances of quitting smoking (Vogt, Hall & Marteau, 2010; Vogt, Hall & Marteau, 2008). Such perceptions are associated with not using treatments (Hammond, Fong & Borland, 2004). Therefore, an effective technique for maintaining service attendance may be to improve service-users' perceptions of service-efficacy.

Icon arrays (a matrix of icons to display risk information showing both the expected number of events and non-events) have been shown to effectively improve patients' medical decision-making (Gigerenzer, Gaissmaier, Kurz-Milcke, Schwartz & Woloshin, 2007), and to increase General Practitioners' beliefs about the effectiveness of the SSS and the number of recommendations made to the services (Vogt, Hall, Hankins & Marteau, 2009). Indeed, presenting smokers with numerical and visual information, including icon arrays, about the effectiveness of the SSS increases smokers' perceptions of their effectiveness (Vogt & Marteau, 2012). The first component of the current intervention aimed at maintaining service attendance was therefore to present a booklet communicating the effectiveness of the SSS.

However, a change in intention does not necessarily lead to a change in behaviour; habitual behaviours can over-ride intention (Gollwitzer, Bayer & McCulloch, 2004). Specifying a cue and a behavioural response, a process called implementation intention, has been shown to

facilitate bridging the gap between intention and behaviour (Gollwitzer, 1999). Forming implementation intentions has shown medium-size effects on a variety of behaviours (Gollwitzer & Sheeran, 2006), including improved cancer screening attendance (Sheeran & Orbell, 2000) and adherence to medication (Brown, Sheeran & Reuber, 2009). Additionally, forming implementation intentions does not require presenting the health risks of smoking, which can avoid defensive information-processing among smokers (Armitage, Harris, Hepton & Napper, 2008). While research supporting the potential for implementation intentions to benefit smoking behaviour is still developing, it has been shown to increase cessation (Armitage, 2007). Thus, the second component of the current intervention consisted of encouraging participants to form an implementation intention to attend the SSS.

In absence of previous research detailing possible effect sizes for these interventions in the current context, the aim of the current study is to pilot (i) the presentation of a booklet communicating the effectiveness of the SSS, and (ii) prompting an implementation intention to attend the SSS, with the aim of enhancing smoking cessation by maintaining service attendance in smokers newly enrolled in the SSS.

METHODS

Design

This project used 2x2 factorial between-subjects design (Montgomery, Peters & Little, 2003). All participants received standard care (SC) from the SSS and were randomly allocated to one of four groups: 1) SC, 2) SC + effectiveness booklet, 3) SC + implementation intention, and 4) SC + effectiveness booklet + implementation intention (Table 1).

Table 1. Allocation of participants to randomised factorial groups.

| | | Implementation intentions | | Total |
|-----------------------|------------|---------------------------|------------|-------|
| | | <u>No</u> | <u>Yes</u> | |
| Effectiveness booklet | <u>No</u> | 38 | 36 | 74 |
| | <u>Yes</u> | 40 | 46 | 86 |
| | Total | 78 | 82 | 160 |

Participants

In total, 160 participants were recruited, aged between 19 years and 80 years, with a mean age of 43.7 (SD=14.2). Of those recruited, 73 (45.6%) were male. A total of 151 reported themselves as ‘White British’, and 9 as “Other Ethnicity”. Participants’ Index of Multiple Deprivation (IMD) levels were also established, as this is known to be associated with quit success (Orleans, 2007). IMD scores ranged between 1.08 and 57.05 (a high IMD score represents a high level of deprivation), and a mean rating of 12.21 (SD=8.7). This represents a lower level of deprivation than the national average of 18.9 (Office for National Statistics, 2010).

Procedure

Participants were consecutively recruited from adult smokers who were newly referred to the Surrey NHS SSS by the Royal Surrey Hospital. Those referred were contacted by the service for the standard telephone screening process that was used to allocate smokers to different service types (telephone support, group clinic, or one-to-one support). One-to-one support was only offered to people with special circumstances that included pregnancy, and mental or physical health issues. Group support was offered across a number of locations, mainly GP surgeries, across Surrey at different times of the week. Telephone support was available from Monday to Thursday, during evenings. All those who wanted to proceed with the referral opted for telephone support. Smokers were invited to the study unless they suffered from mental health problems (as they would then need specialist cessation support), their

knowledge of the English language was not considered sufficient to fully understand the study materials, or they were under the age of eighteen. Smokers were given all relevant information about the study, and were informed that their decision to participate would not impact the support they would receive and that they could withdraw at any time. Those who agreed to participate were then sent an envelope containing a study pack. This included, depending on condition, intervention materials, and the participant information materials. No further contact was made with participants by the researchers. Participants were recruited once a week, over a 6-month period, from January to June, 2011. Approximately 7 participants were recruited per week, all on the same day of the week. No smokers declined participation; however 7 did not meet the inclusion criteria (Figure 1).

A six week gap was left between recruiting the last individual to the study and collecting the outcome data from the NHS database (to allow the final participants to complete the cessation programme). Ethical approval was granted by the NHS National Research Ethics Service.

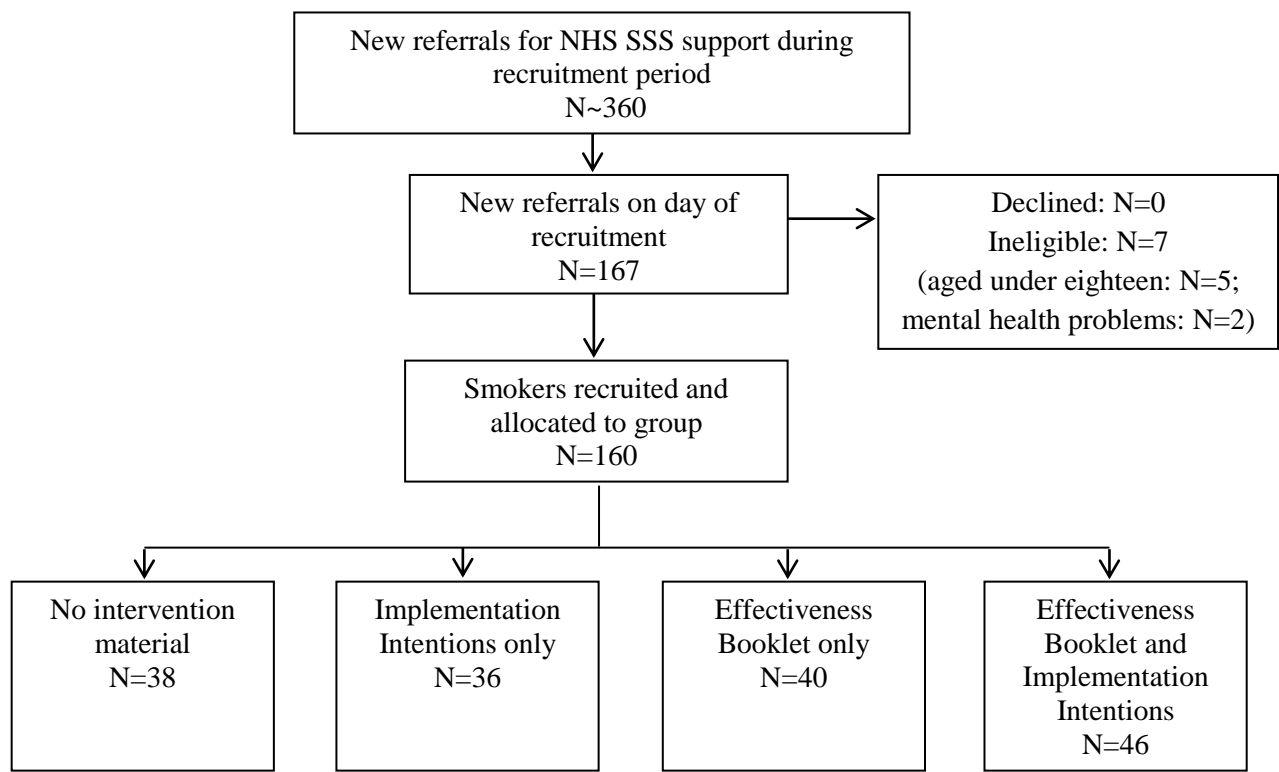
Randomisation

Four sets of the study packs were prepared for the four groups. Numbers representing participants ranging from 1 to 160 were randomly allocated into four groups using an electronic number generator, and then assigned to the packs (see Figure 1). As smokers agreed to participate in the study their name became associated with a number, from 1 to 160 consecutively.

Intervention Materials

SC includes receiving the booklet currently used as routine practice within the NHS SSS (the “Blue Book”), which provides smokers with information about the products available to help

Figure 1. Flowchart of randomisation to the four groups and the two factors



them stop smoking, and advice about what to expect from their quit attempt (SmokeFree Resource Centre).

Effectiveness booklet

This part of the intervention consisted of a booklet designed to clearly demonstrate the benefits of quitting smoking with the Surrey NHS SSS. The booklet was size A5 and had four colour pages including front and back cover (Figure 2). To facilitate accurate understanding, as recommended by reviews, numerical information was supported by visual representation in form of icon arrays (Gigerenzer et al., 2007). Previous research indicates that presenting information in this way increases smokers' perceptions of their effectiveness of the SSS (Hammond et al., 2004). Thus, the two inner pages depicted icon arrays showing one-month quit-rates rates of people quitting alone (22%) as opposed to quitting with the

NHS in England (48%), and then the one-month quit-rates of people quitting with the NHS in England (48%) as opposed to quitting with the Surrey NHS (67%; The NHS Information Service, 2010).

Commonly, the effectiveness of stop smoking support is presented with the relative terms (Fucito & Juliano, 2007; Willemsen, Wiebing, van Emst & Zeeman, 2006). Relative information generally results in higher perceptions of effectiveness, but can reduce accuracy of understanding as it can be misleading, in the absence of the baseline risk (i.e. quit-rates rates of people quitting on their own) (Covey, 2007). Because the baseline risk was depicted in the booklet, information was also given about the relative increase in the chance of stopping smoking with the Surrey NHS as compared with quitting without support (*'You're 3 times more likely to remain smoke free with the Surrey NHS Stop Smoking Service than if you try to quit on your own'*). Finally, the front page highlighted the popularity of the NHS SSS with a sentence stating the number of people who quit smoking with the NHS last year (*'Last year more than 374,964 people quit smoking with the NHS'*).

For participant s allocated to the SC+ effectiveness booklet or SC + effectiveness booklet + implementation intentions groups, this booklet was sent alongside the material sent to all participants, and they were instructed to read the contents of the envelope carefully.

Implementation Intention

This intervention was delivered on an A4 page, separate from the booklet. It provided participants with a list of reasons why people may want to stop their cessation attempt with the NHS SSS. This was followed by the instruction to “Please read the following statement 3 times and repeat it silently to yourself one more time: ‘As soon as I start to doubt about attending my appointment with the NHS Stop Smoking Services, I will ignore that feeling

Figure 2. Content of the effectiveness booklet.

www.ic.nhs.uk/pubs/smoking10

You're 3 times more likely to remain smoke free with the Surrey NHS Stop Smoking Services than if you try to quit on your own

If you require any further information, wish to discuss any issues further please contact:

Dr Florian Vogt on florian.vogt@kcl.ac.uk or c/o 020 7188 2597, Health Psychology, 5th Floor, Bermondsey Wing, King's College London, Guy's Campus, London, SE1 9RT

INFORMATION LEAFLET

KING'S
College
LONDON

GO SMOKE FREE WITH THE SURREY NHS STOP SMOKING SERVICES

Proven effective time and time again. Last year more than 373,964 people quit smoking with the NHS.



CANCER RESEARCH UK

This information comes from the department of health www.ic.nhs.uk/pubs/smoking10

You are much more likely to stop smoking with the NHS Stop Smoking Service.

Success rates one month after the quit attempt.

| Among 100 smokers making a quit attempt on their own | Among 100 smokers making a quit attempt with the NHS Stop Smoking Services |
|---|--|
| <ul style="list-style-type: none"> 22 remain smokefree 78 smoking again  | <ul style="list-style-type: none"> 48 remain smoke free 52 smoking again  |

Luckily for you, compared to other areas in England, the Surrey NHS Stop Smoking Service, is even better at helping people quit.

Success rates one month after the quit attempt.

| Among 100 smokers making a quit attempt with the NHS Stop Smoking Services | Among 100 smokers making a quit attempt with the Surrey NHS Stop Smoking Services |
|---|--|
| <ul style="list-style-type: none"> 48 remain smoke free 52 smoking again  | <ul style="list-style-type: none"> 67 remain smoke free 33 smoking again  |

www.ic.nhs.uk/pubs/smoking10

THIS INFORMATION COMES FROM THE DEPARTMENT OF HEALTH www.ic.nhs.uk/pubs/smoking10

and tell myself this is perfectly normal to feel that way!’”. Participants were then asked to tick a box to confirm that they had followed this instruction. Although implementation intentions have traditionally required participants to create their own plans and goals (Gollwitzer, 1999), presenting predesigned plans in questionnaire format has been found to effectively increase psychotherapy attendance (Sheeran, Aubrey & Kellett, 2007).

Measures

The outcomes of interest (attendance and 4-week quit success) were obtained from routine information collected through the SSS.

Attendance and smoking cessation

Attendance and smoking cessation were assessed by the Service by the stop smoking advisor assigned to each smoker. Records of each individual’s attendance and final smoking status were recorded on hard-copies of the quit record, then entered into the electronic database of the Service after the participant had exited the treatment program. If smokers continued to participate in sessions of the treatment programme until the point of setting a quit date they were considered ‘attenders’ and if they did not, they were classified by the Service as ‘non-attenders’ on the Service’s database. As all participants recruited signed up to receive telephone support, ‘attendance’ was defined as participating in their telephone counselling session every week. If participants missed 3 or more consecutive weekly appointments, they were classified as ‘drop-outs’. Setting a quit date was used to define attendance, as it is the point at which smokers are officially entered onto the NHS SSS database and their quit attempt recorded.

The 4-week quit-rate (measured routinely in the Surrey NHS SSS) was established through carbon monoxide breath tests where possible, otherwise through self-report. The NHS records did not identify which methods had been used for each smoker, forbidding further analysis. Those abstinent at 4 weeks after their quit-date were classified as ‘quit’ and those not abstinent were classified as ‘smoking’. If smokers were deemed ‘lost to follow-up’ (remaining un-contactable after 3 weekly consecutive contact attempts), they were recorded as ‘smokers’.

Socio-demographic characteristics

Characteristics, including age, gender and socio-economic status were gathered from the routine information recorded in the NHS SSS database. Participants’ socio-economic status was indicated through the Index of Multiple Deprivation (IMD), established through cross-referencing participants’ postcodes with Lower Super Output Area (LSOA) codes (Information Discovery, 2011). The corresponding IMD was then assessed for each LSOA using the Neighbourhood Statistics Data (Neighbourhood Statistics Data, 2007).

Smoking cessation medications

Information on the type of medication used by smokers to support their quit attempt was obtained from the routine information recorded in the NHS SSS database. The three medications (i.e. Varenicline, Bupropion or Nicotine Replacement Therapy (NRT)) supported by the SSS were given a numerical value according to their level of efficacy. All these medications increase the chance of stopping smoking compared to using no medication (Wu, Wilson, Dimoulas & Mills, 2006). However, while evidence suggests that there is no difference in effectiveness between Bupropion and NRT, Varenicline is more effective than both. To reflect the different impact, the type of medication used by smokers was categorised into a variable called “efficacy of smoking cessation medication” with three levels: no

efficacy (no medication), efficacious (Bupropion and NRT), and highly efficacious (Varenicline).

Statistical Analyses

Descriptive statistics were used to provide an overview of the participants. A Chi-square analysis was conducted to examine a potential relationship between attendance and 4-week smoking status. One logistic regression analysis was then conducted to examine the impacts of the interventions on attendance and another to examine the impacts of the interventions on 4-week smoking status. In each regression, both interventions and potential confounding variables (i.e. age, gender, ethnicity, IMD rating and efficacy of smoking cessation medication) were included to obtain independent effects for each intervention. To test whether there were additive effects of receiving the effectiveness booklet and the implementation intention, both models were also run with the interaction between the effectiveness booklet and the implementation intention.

RESULTS

Descriptive statistics

Table 2 shows the descriptive statistics of the 160 participants enrolled in this study. Levels of social deprivation, proportion of female participants, ethnicity and efficacy of smoking cessation medication were comparable across groups. There was a significant difference in mean age between the participants receiving the implementation intentions (M= 46.6 years) and those in the control group (M= 41.0 years).

All data used in the analysis was obtained from the routine SSS records and consequently available for all 160 participants. Table 3 shows the proportion of participants attending the service until setting a quit date and those who had quit smoking at 4-weeks. Of those receiving the effectiveness booklet 49 (57.0%) set a quit date and 35 (40.7%) had quit

Table 2. Participant characteristics

| | Effectiveness Booklet | | Implementation Intentions | |
|---|-----------------------|-------------|---------------------------|---------------|
| | <u>No</u> | <u>Yes</u> | <u>No</u> | <u>Yes</u> |
| Participants, N | 74 | 86 | 78 | 82 |
| age, Mean (SD) | 43.7 (15.3) | 43.7 (13.7) | 46.6 (13.0) ** | 41.0 (15.3)** |
| Social deprivation, mean (SD) | 12.4 (8.3) | 12.1 (9.0) | 11.6 (7.5) | 12.8 (9.6) |
| Female, % (N) | 51% (38) | 57% (49) | 59% (46) | 50% (41) |
| White British, % (N) | 91% (67) | 98% (84) | 92% (72) | 96% (79) |
| Efficacy of smoking cessation medication, Mean (SD) | 2.3 (0.7) | 2.4 (0.6) | 2.3 (0.7) | 2.4 (0.7) |

Note: *p<0.05, **p<0.01.

smoking at 4 weeks; of those not receiving the effectiveness booklet 20 (27.0%) and 19 (25.7%) had set a quit date and quit at 4-weeks respectively. Of those patients receiving the implementation intentions, 35 (32.7%) set a quit date and 27 (32.9%) had quit at 4-weeks; in the control group, 27 (32.9%) set a quit date and 27 (34.6%) had quit at 4-weeks.

Table 3: Proportion of individuals who attended the service and quit smoking by main effect of those receiving the intervention

| | Effectiveness Booklet | | Implementation Intentions | |
|--|-----------------------|----------------------|---------------------------|----------------------|
| | <u>No</u> (N=74) | <u>Yes</u> (N=86) | <u>No</u> (N=78) | <u>Yes</u> (N=82) |
| Attended service up to setting a quit date | 27.0% (n=20) | 57.0% (n=49) | 43.6% (n=34) | 42.7% (n=35) |
| Quit at 4-weeks | 25.7% (n=19) | 40.7% (n=35) | 34.6% (n=27) | 32.9% (n=27) |

Relationship between attendance and 4-week smoking status

Attendance and 4-week smoking status were positively related (chi-square with one degree of freedom, $\rho = 87.52$, $p < 0.001$). Those who maintained their quit attempt to the point of setting a quit date were more likely to have quit smoking at 4-weeks.

Impact on attendance

Allocation to the effectiveness booklet significantly increased attendance by 30% (NNT: 3.3, Table 3; OR= 2.93, $p < 0.01$, 95% CI: 1.45-5.93, Table 4). Allocation to the implementation intention did not increase attendance (OR= 1.07, 95% CI: 0.52-2.18). The only covariate that

was significantly associated with attendance was efficacy of smoking cessation medication (OR= 1.98, $p<0.05$, 95% CI: 1.13-3.46); a more efficacious smoking cessation medication was associated with increased attendance. There was no interaction between the effectiveness booklet and the implementation intention (OR= 1.33, 95% CI: 0.35-5.03).

Impact on 4-week smoking status

Allocation to the effectiveness booklet did not increase abstinence (OR= 1.55, 95% CI: 0.75-3.21, Table 4). Allocation to the implementation intentions did not increase abstinence (OR= 1.12, 95% CI: 0.54-2.33). Efficacy of smoking cessation medication was significantly associated with abstinence (OR= 1.83, $p<0.05$, 95% CI: 1.03-3.26); a more efficacious smoking cessation medication was associated with increased abstinence. Gender was also significantly associated with abstinence (OR= 2.29, $p<0.05$, 95% CI: 1.10-4.73); females were more likely to be abstinent at 4-weeks than males. There was no interaction between the effectiveness booklet and the implementation intention (OR= 0.93, 95% CI: 0.24-3.61).

Table 4. Effects of interventions on service attendance and 4-week quit status in multivariate logistic regression.

| | Attended service up to setting a quit date | | Quit at 4-week | |
|--|--|------------------|----------------|------------------|
| | B(SE) | OR (95% CI) | B(SE) | OR (95% CI) |
| Effectiveness booklet | 1.08 (0.36)** | 2.93 (1.45-5.93) | 0.44 (0.37) | 1.55 (0.75-3.21) |
| Implementation Intentions | 0.06 (0.36) | 1.07 (0.52-2.18) | 0.12 (0.37) | 1.12 (0.54-2.33) |
| Age | 0.02 (0.01) | 1.02 (0.99-1.05) | 0.02 (0.01) | 1.02 (0.98-1.05) |
| Gender | 0.61 (0.36) | 1.83 (0.91-3.69) | 0.83 (0.37)* | 2.29 (1.10-4.73) |
| Ethnicity | -0.63 (0.85) | 0.53 (0.10-2.84) | -0.41 (0.86) | 0.67 (0.12-3.59) |
| IMD Rating | 0.00 (0.02) | 1.00 (0.96-1.04) | -0.01 (0.02) | 0.99 (0.95-1.03) |
| Efficacy of smoking cessation medication | 0.68 (0.28)* | 1.98 (1.13-3.46) | 0.60 (1.21)* | 1.83 (1.03-3.26) |

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$; for efficacy of smoking cessation medication, higher number denotes increased efficacy; for IMD, higher number denotes increased deprivation.

DISCUSSION

Receipt of the booklet was found to significantly enhance attendance at the NHS SSS, which supports previous research findings emphasizing the benefits of presenting information about treatment benefits on treatment use (Petrie, Perry, Broadbent & Weinman, 2012) and in particular treatments to aid smoking cessation (Rothman, Bartels, Wlaschin & Salovey, 2006). Importantly, our booklet increased attendance over and above the resource sent to smokers by the NHS SSS (the “Blue Book”) in standard care.

Normally, treatments are presented to smokers with relative information about the effect size (e.g. the “Blue Book”). Relative information about treatments can make effects appear exceedingly large (Covey, 2007), a factor that may explain why randomized controlled trials are mostly presented using relative-risk information (Nuovo, Melnikow & Chang, 2002).

This study had as a novel component, the presentation of the absolute information, as well as the relative information. It shows that doing this may not hinder the performance of the targeted behaviour but actually be beneficial. Previous research has already shown that it can have a positive impact on perceptions (Vogt et al., 2012). We also used icon arrays which have been shown to be effective at improving patients’ medical decision-making (Gigerenzer et al., 2007). It is not possible, however, to assess which or to what extent different aspects of the information were responsible for the increase in attendance; there was no unique manipulation of the information components. One component of the information was the comparison of the aspect of the smoking cessation success rates in Surrey to those achieved Nationwide. Surrey’s SSS high success rates may be due to the relatively high level of SES in Surrey (Office for National Statistics, 2010), as high SES is associated with increased levels of smoking cessation (Orleans, 2007). It may also be the result of carefully implementing evidence-based guidelines (McDermott, Thomson, West, Kenyon & McEwen, 2012). Further

studies in areas with lower levels of smoking cessation success rates are warranted to confirm that the motivating properties of information about success rates are generalisable in the absence of favourable comparisons to the nationwide success rates; in practice this might mean that such a comparison can only be used if the comparison is favourable.

The effectiveness booklet failed to create a significant increase in 4-week smoking cessation levels. Successful quitting is influenced by a number of additional processes happening within the smoking cessation attempt other than attendance, such as severity of withdrawal symptoms (Piper, Schlam, Cook, Sheffer, Smith & Loh et al., 2011), life events (Kriegbaum, Larsen, Christensen, Lund & Osler, 2011), and choice of cessation medication (Wu et al., 2006). We detected an odds ratio for 4-week quit status of 1.55, and although non-significant, replication with a larger sample size may narrow the confidence intervals and demonstrate a significance impact. On the other hand, this finding supports previous conclusions that provision of written materials does not provide added benefits to the effects of face-to-face support or provision of smoking cessation medications (Lancaster & Stead, 2005). However it is important to note that our aim was not to provide a smoking cessation intervention itself, but rather to maintain attendance of the NHS SSS. Because we detected an increase in attendance and the effect size on abstinence was sizable, we judge that the former explanation is more likely.

The implementation intention aspect of the intervention did not influence attendance or abstinence. There are several explanations for this result. Firstly, the original conceptualisation of implementation intentions involved participants identifying their own environmental cue, and developing their own 'if-then' statements (Gollwitzer, 1999). Simply

requiring participants to read pre-designed if-then statements (and tick appropriate boxes) appears to be insufficient to create behavioural changes, despite previous findings suggesting otherwise (Sheeran et al., 2007). It has been shown through content analysis that more active involvement in forming implementation intentions (i.e. writing down the implementation intentions) is associated with increased behaviour change (Armitage, 2007). Furthermore, while participants may have read the effectiveness booklet, the implementation intentions intervention may have been ignored by people. It is likely that the failure of this intervention results from both the passivity of delivery and low exposure.

This research adds to the current literature by providing additional mediating variables which may be targeted when attempting to increase cessation levels. Firstly, the strong relationship between attendance and 4-week quit success supports findings that increased service attendance is associated with increased abstinence (Dorner, Tröstl, Womastek & Gromer, 2011). However, this finding is based on the assumption that participants who did not attend the SSS remained smokers, which is not necessarily true. Thus the association should be interpreted with some caution.

The finding that being female is associated with 4-week quit success contradicts the empirical literature; a recent meta-analysis concluded that cessation attempts tend to be more successful in men than women (Torchalla, Okoli, Hemsinh & Greaves, 2011). It is unclear why this contradiction has occurred, however women have higher long-term relapse rates than men (Piper, Cook, Schlam, Jorenby, Smith & Bolt, 2010). Collecting long-term quit outcome data may reveal that although being more likely to quit at 4 weeks, women may

show lower long-term abstinence levels.

A final interesting result from the behavioural outcomes analyses is the association between efficacy of pharmacotherapy and attendance. To date, there is little evidence connecting type of pharmacological support and service attendance. Attendance was measured at the point of setting a quit-date. Depending on the type, some smokers may have already used their medication and experienced a reduction of craving, which increased the ease of pursuing the quit attempt. Alternatively, it may be that those who were using medication had invested more commitment into the quit attempt, having had to obtain prescriptions and medication, which boosted their sustained their motivation to attend. Also, choosing more effectiveness medications may reflect greater motivation to stop smoking which increased attendance.

This research has several strengths. First, the randomised, controlled design is in line with the ‘gold-standard’ in psychological research, allowing causal relationships between variables to be addressed. Second, conducting the study within an NHS service increases likelihood that the findings are applicable to the wider population. Third, uptake of the highly effective SSS is so low and developing an intervention to improve uptake is a crucial yet under-researched field. Fourth, this study has tested a potentially cost-effective intervention, which can easily be incorporated into primary care services; this intervention could have significant, realistic implications for public health policy and practice.

There are also limitations to the research. Groups were established completely at random and this resulted in slightly unequal group sizes; the alternative would have been to specify 40 people per group. If replicated as a larger study, stratified block randomisation would be the

preferred randomisation procedure. Second, this pilot study was not powered to detect an effect in quit rate, limiting the conclusions that can be drawn upon this outcome. Third, it is unknown the extent to which people actually read the intervention materials. This is a particular concern for the implementation intention intervention, which showed no effect. As previously mentioned, requiring participants to make active, personalised implementation intentions may be required for an implementation intentions intervention. Fifth, the results were obtained in an area with high levels of smoking cessation success and the same intervention might be less effective in areas that have less favourable success rates. Further studies are needed to confirm that the motivating properties of information about success rates are generalisable to other locations. Additionally, participants were recruited on the same day every week, which may further limit the generalisability of these results, and future studies should correct for this limitation. While the study attempted to blind the researcher to the allocation procedure, it is feasible that the researcher could have remembered which of the numbers from 1 to 160 were allocated to which condition, when randomisation was performed. This study did not have the means to implement a blinded randomisation procedure. If replicated as a larger study, the recruiting researcher should be blinded to the randomization groups to avoid bias.

It would be important to examine the impact of this intervention on patients receiving other forms of cessation support. All participants in the current study had selected telephone support despite being offered the other forms of support. Because the Surrey SSS offers one-to-one support only to individuals with special needs, group support was the most likely alternative. Unfortunately, no information was collected on the reasons for people's choices but it may reflect convenience. Alternatively, many stop smoking groups were based in GP surgeries, which smokers may have wanted to avoid informing of their quit attempt. The

impact of this intervention on cessation strategies involving face-to-face contact remains unknown and requires further piloting.

Our findings present various interesting directions for future research. Replication of this study with a larger sample size, and in different localities would inform further development of the leaflet, indicating whether 4-week quit status can be influenced with greater power, and whether the intervention is relevant to smokers using different SSS. Furthermore, it would be useful to understand how this intervention had its effect, through the measurement of potential mediating variables, such as self-efficacy or outcome expectations. Collecting more data about these mediating processes would provide interesting scope for future intervention targeting the cognitions pertinent to service uptake and attendance.

CONCLUSION

In conclusion, providing risk information significantly increased service attendance but had no impact on 4-week smoking status. Implementation intention had no impact on either attendance or 4-week quit success. The findings of this intervention suggest an effective and cost-effective method through which service attendance may be increased, with potential impact on subsequently smoking cessation.

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